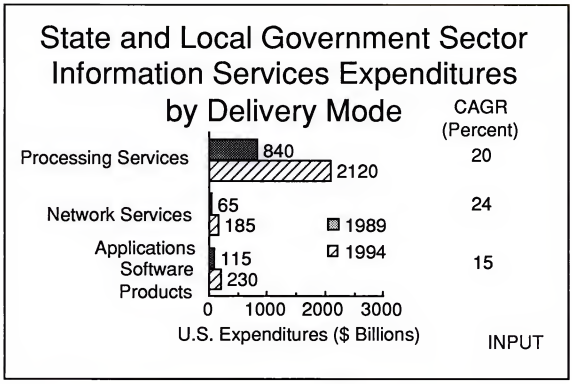

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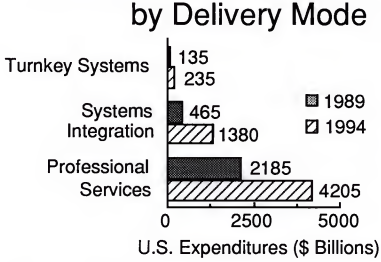
State and Local Government Sector Information Services Expenditures by Delivery Mode



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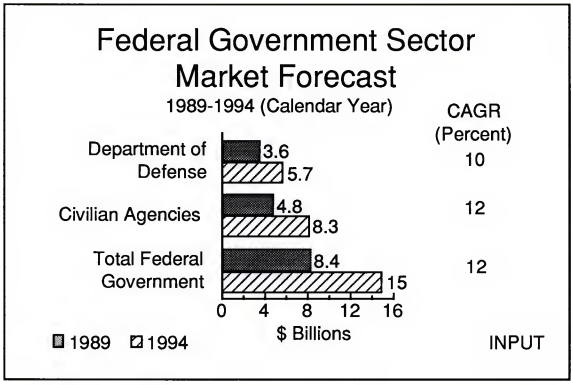

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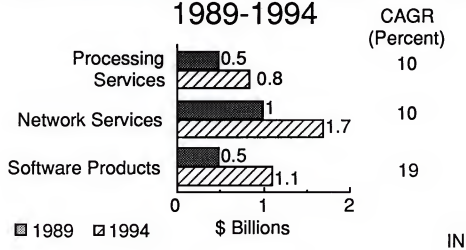
Federal Government Information Services Markets by Delivery Mode 1989-1994



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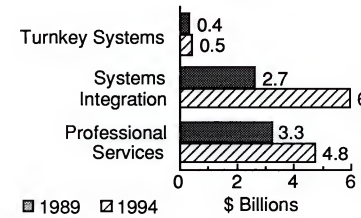
Federal Government Information Services Markets by Delivery Mode 1989-1994



Notes

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Medical Industry—Trends

- Movement to HMOs, away from traditional health care
- Aging U.S. population
- Government regulation
  - MediCare catastrophic illness
  - Prescription reimbursements
  - Medicare budget cutting

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Vendor Opportunities

- Integrated systems
- Clinical/laboratory applications
- Networking: physicians & hospitals
- Professional services

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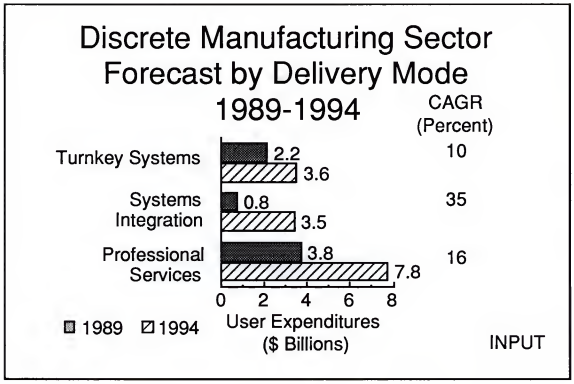

Notes

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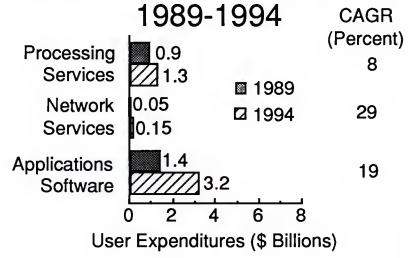
Discrete Manufacturing Sector Forecast by Delivery Mode 1989-1994



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Trends—Discrete Manufacturing

- Large market, growing at 16%
- High-end MRPII saturation
- Micro-based solutions & workstations
- Need for integrated systems

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State and Local Government Driving Forces

- Changes in information systems organization
- Lack of internal staff expertise
- Reliance on information services vendors

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Issues for IS Departments

- Rising expectations of key users and officials
- User demands for more complex solutions
- Planning for changes in technology
- Productivity and backlogs
- Integration of data/technology applications
- Budgeting and funding

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Federal Government

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Federal Government Sector Issues

- Cost containment
- Acquisition reforms
- Budget deficit control measures

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Federal Government Sector Issues

- Regulations imposed on agency
- Internal agreement on requirements
- Availability of skilled staff

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Federal Government Sector Driving Forces

- Rising service demands
- Equipment obsolescence
- High maintenance costs
- End-user computing needs

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Federal Government Sector Driving Forces

- Connectivity requirements
- Improved security/privacy demands
- Presidential priority programs

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Federal IS Goals and Objectives

- Improve information technology support
- Improve productivity
- Maintain and enhance systems
- Increase contracting out
- Overcome staff shortages

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Medical

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Medical Industry—Trends

- Need for functional integration
  - Patient care
  - Billing/financial
  - Clinical/testing
  - Medical records

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Vendor Opportunities

- "Point of care" systems
- Skill nursing/health care systems
- Physicians: PC usage
- Prescription drug programs

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Trends—Higher Education

- Centralized IS control
- Integrated, networked solutions
- Standards for intercampus networking
- Spending on microcomputers in past, leading to connectivity needs

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Trends—Higher Education

- User involvement in software
- Development
- CAI/courseware development
  - EDUCOM
- Budgetary concerns

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Driving Forces—Higher Education

- Administrative applications
- Research applications
- Word processing (faculty/students)
- Intracampus networking

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RBOC Network Services

- Integrated services digital network (ISDN)
- Information gateways
- Virtual private networks
- Metropolitan-area networks (MAN)

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RBOC Network Services

- Open network architecture (ONA)—future
- Videotex (future)—subsidized terminals?
- Voicemail
- Electronic mail
- Voice recognition services

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RBOC Network Services Limited by:

- Varying services make national customer network usage difficult
- Gateways limited to LATA
- RBOC "culture"
- RBOC sales/marketing expertise

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Notes

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Conclusions—Network Services Markets

- Data base alone Is not a guarantee of success
- Vendors can leverage unique
- Gateways and interfaces
- OLDB companies are highly valued
- RBOCs will be a factor
- EDI has leverage into interorganizational services
- Market growth remains strong

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MPRE90-278a,b

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Discrete Manufacturing

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Trends—Discrete Manufacturing

- MAP versus Ethernet—inconclusive
- CIM—from buzzword to reality?
- Rapid growth in CAD/CAM, but on less expensive platforms

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Notes

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Discrete Manufacturing Leading Vendors

Vendor	1988 US Revenues ($M)*	Market Share (%)
Prime (Computervision)	500	6
IBM	480	6
Intergraph	450	5
McDonnell Douglas	240	3

* INPUT Estimate

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Notes

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Discrete Manufacturing Leading Vendors

Vendor	1988 US Revenues ($M)*	Market Share (%)
Schlumberger	210	3
Arthur Andersen	200	2
Control Data	140	2

* INPUT Estimate

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User Satisfaction with SO Vendor Performance

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Systems Operations Vendor Selection Criteria—Buyers' View

Ranking	Criteria
1	Vendor SO experience
2	Overall cost
3	Data security and protection
4	SO performed by prime SI contractor
5	Vendor-provided hardware and systems software maintenance
6	Application software maintenance

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Notes

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Discrete Manufacturing Leading Vendors

Vendor	1988 US Revenues ($M)*	Market Share (%)
Gerber	130	2
ASK	130	2
Boeing	105	1
All Others		68

* INPUT Estimate

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Vendor Recommendations: Discrete Manufacturing

- Be a leader in your niche
- Build alliances, provide integrated solutions
- Look at international markets

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Banking and Finance

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Banking/Finance Industry Trends—Examples

Changing Outlook for Individual Products/Services

- Product creation/evolution proceeding at more rapid pace
- 24 hour/automated trading systems
- Increased demand for electronic information services

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State and Local Government

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Notes

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European Companies

- CAP Gemini Sogetti (CAP-SESA) is parent of CAP GEMINI AMERICA (CGA)
  - Close to $1 billion in 1989
  - Focus on professional services
- Aggressive acquirer
- Will not attack operations market directly
  - Provide support services
  - Emphasizes development market

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Notes

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Fundamental Driving Forces

- *Apply to the information systems and services industry*
- *Are restructuring the role of IS management*
  - Reactive to proactive
  - Technology-driven to user-driven
  - Centralized to "federated"

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Notes

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Big-Six Accounting Professional Services

- Predominately accounting/audit
- Professional services growing faster
- Andersen Consulting reorganization
- Entering software markets
  - Andersen's *Foundation*
  - Peat Marwick's *Catalyst*
- Mergers/acquisitions/strategic alliances

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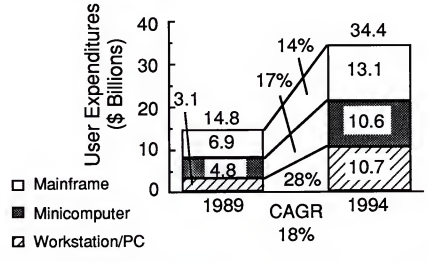
Systems Software Product Market by Platform Size, 1989-1994



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Notes

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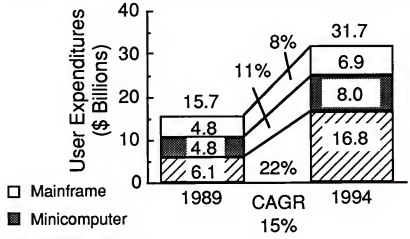
Applications Software Product Market by Platform Size, 1989-1994



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Notes

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Network Standards Battle

OSI NM standards

Vendor 'standards'
- Netview, IBM
- UNMA, AT&T
- NetPartner, AT&T
- Other vendors

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Notes

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CASE Vendors

- Index Technology

  The largest vendor, one of the first, with a front-end focus

- KnowledgeWare

  The first U.S.-based front-end tool developer to introduce a code generator

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CASE Vendors

- Cadre Technologies

  A real-time systems CASE vendor trying to enter the IS market

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CASE Vendors

- Bachman Information Systems

  The first to truly address re-engineering

- Softlab

  An established German vendor entering the U.S. market

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CASE Vendors

- Texas Instruments

  A full I-CASE vendor with a very specific solution

- Andersen Consulting

  A professional services company applying technology to its proven methodology

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Systems Operations
Definition

Operation of all or a major portion of a customer's information systems function on a long-term (more than one year) contract.

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Notes

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Characteristics of Types of Systems Operations

Location of Main Computer	Ownership of Main Computer	
	Vendor	Customer
Vendor Site	**Processing Services**	Professional Services
Customer Site	Processing Services	**Professional Services**

Dominant modes

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Characteristics of Types of Systems Operations

Location of Main Computer	Dedication of Main Computer	
	Shared	Single Customer
Vendor Site	**Processing Services**	Processing Services
Customer Site	Professional Services	**Professional Services**

Dominant modes

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Characteristics of Types of Systems Operations

Application Provider	Type of Systems Operation	
	Platform	Application
Customer	X	
Systems Operation Vendor		X
Third-Party	X	(X)

◯ New mode of partnership

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Notes

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Trends

Large Scale SI Projects

Systems Operations Contracts

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Systems Operations Buyers' Initial Evaluation Criteria

Ranking	Criteria
1	Better or more-flexible service
2	Availability of operations skills internally
3	Lower operating expenses
4	Faster application changes
5	Data security/privacy
6	Faster new application development

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Systems Operations Buyers' Initial Evaluation Criteria

Ranking	Criteria
7	Ability to add/delete personnel
8	Reduced capital investment requirements
9	Mission-critical application
10	Near-term cash flow improvements
11	Labor relations/unions
12	Executive time commitment

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Systems Operations Targets

- Industry Markets
  - Volatile, rapidly changing environment
    e.g. semiconductor manufacturing, construction
  - Strong cost pressures and systems needs
  - Restructuring, e.g. advertising

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Systems Operations Targets

- Prospect Companies
  - Expanding multinationals, particularly aggressive acquirers
  - Troubled companies, going through turnaround
  - Very fast-growing companies
  - Companies undergoing major organizational changes, e.g. LBOs, divestiture

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Systems Operations Targets

- Prospect Companies
  - Companies wanting to change basic IS architecture (e.g. Honeywell to IBM)
  - Companies with disparate, incompatible computer centers

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Systems Operations Targets

- Companies with major development contracts with professional services companies without operational capability
- Generally medium/large companies for domestic U.S. services and large/very large for international services

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Who is the SO Buyer?

- Varies greatly—dependent on prospect
- Individual more than team
- Customized marketing required

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What is the SO Buyer Looking For?

- Depends on the prospect
- Requires customized marketing

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What are the SO Buyer's Key Motivators?

- Most often, solving a problem
- Reducing risk and time often important
- Scarcity of people

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Essential SO Service Requirements

- Computer, communications, software and people package
- Complete, up-to-date operation using accepted standards
- Varied, detailed support requirements
- Simple, accurate billing

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SO Terms Characteristics

- Resource use pricing difficult
- Price-packaging required
- Flexible period of contract
- Charge for value-added support
- Customized contracts

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"Computer Utility" Market

- Small market for supercomputer computation services
- Small, transient market for compute capability only
- All markets require other value-added parameters
  - Operational, "computer-utility"
  - Applications, FM/SO

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Therefore Do Not Use the Term "Computer Utility"

- "Systems utility"
- "Support services"
- "Operations support" (IBM term)
- "Systems operational services" (SOS!)
- "Computer operation services"

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Platform Systems Operations =
Computer/Systems Utility

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Platform Systems Operations

Prospect View of System
Utility Relationship

- "Technology" rather than "application" solution
- View could be:
  - Short-term, solve a problem
  - Long-term, provide basic architecture

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Prospect View of System Utility Relationship

- Account control will vary
  - Strong for technology
  - Medium to weak for applications
  - Varied for people
- Competition for other IT services will be strongly affected

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Prospect View of System Utility Relationship

- Should become stronger over time
- Opportunity for service expansion

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Systems Utility Partnering Opportunity

- Could be key motivator
  - Compute utility/operational capability
  - Vendor application/industry capability

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Impact on Existing Markets

- "Traditional" FM/SO markets could be attacked by combination of:
  - Systems utility
  - Application/industry specialist software/service

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"Systems Utility" Market Potential

- Vast, unmeasurable
- Replaces in-house data/network centers
- Attractive features:
  - Avoids equipment upgrade/choices
  - Avoids software (operating systems/DBMS/ communications) upgrade/operations problems
  - Avoids systems staffing needs and problems
  - Avoids maintenance problems

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"Systems Utility" Market Potential

- Increasingly data/network centers are 'operatorless'
- Can be moved, taken over without users noticing
- INPUT always considered major opportunity

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"Systems Utility" Market Potential

- Questions
  - To what extent will IBM impact its own business?
  - Can anyone else impact the market as well?

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"Systems Utility" Market Potential

- Issues to be addressed:
  - Ownership
  - Control
  - Security
  - Competitiveness
  - People

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Recommendations

- Include systems operations and systems integration in business strategies
- Focus on full service offerings
- Target organizations experiencing change
- Leverage skills and resources

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Systems Integration: Globalized Activity

- Gaining overseas acceptance
- Prime contractors need local subcontractor relationships
- Big players with deep pockets and high visibility required
- Leads to systems operations (facilities management) contracts

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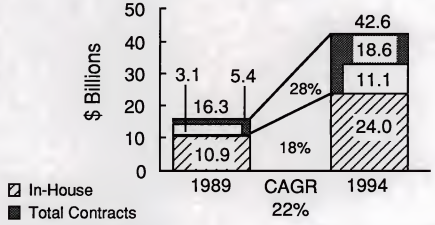
Commercial Systems Integration Project
Value and Expenditures, 1989-1994



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Key Commercial SI Market Factors

- Rising demand for connectivity
- Major infrastructure rebuilding
- Growing user management trend
- Growing application complexity

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Cross-Industry Market Distribution, 1989

Cross-Industry	$ Millions	
	Total Value	Average Award
Office	490	6.5
Engineering/Science	428	33.0
Automation	280	13.5
Accounting	208	5.2
Others	140	3.4

INPUT SI Data Base

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Vendor Selection Criteria

Type	Percent of Respondents
Support skills	64
Service orientation	50
On-site visits	43
References	43
Alliances	21

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Buyer Acceptance Methodologies

Type	Percent of Respondents
Performance criteria	40
Functionality definition	26
Simulation	13
Prototype/parallel processing/unknown	7 (each)

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Market Share by Competition Class, Mid-1989

Vendor Class	Percent of Market		
	Federal	Commercial	Overall
Hardware manufacturers	21	24	23
Communication vendors	6	12	9
Professional services	50	30	40
"Big 6"	4	12	8
Aerospace	15	9	12
Other	4	13	8

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Future Trends

- New domestic and off-shore competitors as primary and secondary vendors
- Increased centralization of vendor SI "product" management
- Increased development of program management methods

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Future Trends

- Growing marketing/promotion investment
- Formal market strategy development by non-SI vendors
- Telecommunications and engineering companies

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Conclusions

- Financial characteristics
  - Rapid revenue growth
  - Commercial profits—stable/increasing
  - Federal profits—stable/decreasing

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Conclusions

- SI market strategies
  - Vertical market penetration
  - Full service emphasis
  - Fewer cross-industry markets
  - User business sensitivity
  - Less emphasis on alliances

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Conclusions

- Buyer Emphasis
  - Users becoming buyers
  - Interest in solutions, not technology
  - Preference for industry knowledge
  - Project management key
  - Acceptance by performance

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Vendor Recommendations

- Develop/expand business consulting skills
- Involve program managers in business acquisitions
- Use repeatable processes, strive for end-to-end methodologies

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Computer Sciences Corp/Infonet

- Continues strong in federal markets
  - Primarily professional services/SI
- Resurgent interest in commercial markets
  - Health and insurance
  - Tax and credit
  - Professional services/SI

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Computer Sciences Corp/Infonet

- Acquisitions key to commercial activities
  - Index
  - Computer Partners

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IBM

- Fundamental changes
- 1. Sales incentives for services
- 2. Willingness to provide systems operations services

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IBM National Services Division

- Will provide systems operations for customers
- 30,000 people
- Works with IBM's SID and INS operations

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IBM National Services Division

- Provides all "operations support" functions
  - Data center design and building
  - Remote, "Lights-out" data center operations
  - Hardware/software/network maintenance
  - Disaster recovery
  - End-user software support
  - Systems operations studies
  - Conversion services

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Aerospace Subsidiaries

- Tried the "Computer Utility" route
- Have enjoyed limited success
- Successes
  1. Government
     - BCS
     - Gruman
     - MMDS
  2. Specialized areas
     - TRW

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Aerospace Companies

- Litton Computer Services
- Provides "computer utility" processing services
  - $30M revenues
  - "Packaged" pricing
  - Emphasis in Los Angeles

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European Companies

- Hoskyns:
  - Very successful in FM
  - Good "computer utility" model
  - Avoided industry specialization
- Thorn-EMI
  - Also successful in processing utility
- SD-Scicon, GSI, Sema-Cap, others
- PTTs becoming more aggressive

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Japanese Companies

- NT&T Data Services
  - Primary market government
  - SI/Systems operations
- Many VAN companies (500)

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U.S. Information Services Market

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Summing It Up

- Broadening product strategies
- Emphasis on "solution" niches
- Focus on quality and service

Accomplished through:

- Self-funded expansion
- Consolidation—partnering/acquisitions

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Where's the Productivity?

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Technology is a Mixed Blessing

- Technology adds complexity
- Poor application is counter-productive
- Change process with systems

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The Human Element

- Changing systems is a process
- Evolution not revolution

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Concerns

- Ergonomics
- Health
- Deskilling
- Organization
- Redundance
- Progress

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CIM—The Human Element

- U.S.
  - Technology as a fix
- Japan
  - Technology plus people

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V.P. Humatics

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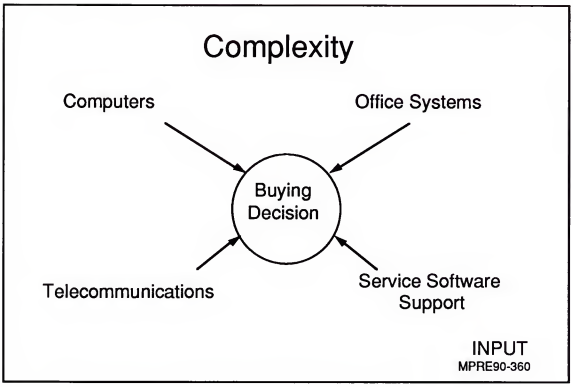

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Law 1

Rate of supply >
rate of absorption

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IS Trends

- IS to reduce costs
- IS for competitive advantage
- Mission-critical systems
- Inter-enterprise systems
- Integrated customer-oriented systems

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Next Generation of DBMSs

- Distributed/networked
- Interconnected
- Relational +
- Information-oriented
- Hardware-assisted

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Strategic Values

- Information
- Information systems (IS)
- Information technology (IT)

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Without Change There is No Benefit from IS

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Corporate Organization

- IT and IS will change the organization
- How will it operate?
- People
  - How many?
  - When?
  - What skills?

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Limits to Growth

- Absorption rate
  - Implementation
  - Education and training
  - Organization changes
  - Resistance to change
  - Logistics

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Buying Process Changing

- Involves
  - Users
  - IS management
  - Finance
  - Corporate management
- More specialists

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IS Issues

- Reporting structure
- Scope of responsibility
- Budgetary authority
- Senior management people expectations

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Development

- Where performed?
- By whom?

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Telecommunications

- Responsibility?
- Integration?

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Internal IS Considerations

- Who owns the data?
- Who gets benefit from its use?
- Is information an "asset"? Or is it free?

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Other Issues

- Education and training
- Standards and policies

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Make vs. Buy

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Micro-Mainframe
vs.
Micro-LAN-Mainframe
vs.
Micro-Mini-Mainframe

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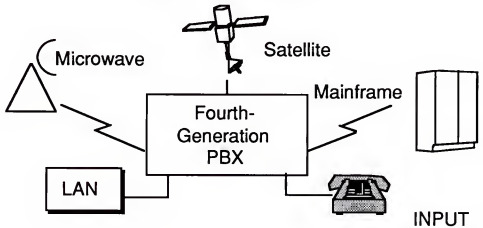
Fourth-Generation PBX: The Voice/Data Manager of the Future



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The Network Will Become the System

- Implications for users
  - Nodes are almost equal in power
  - Telecommunications skills are vital
  - IS management at many nodes
  - More complex systems design

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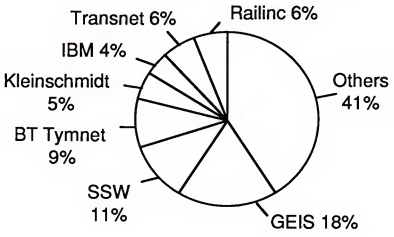
EDI Network Services Market Shares



Excludes private networks, EMC, interface, federal

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Forecasts Are for U.S. Non-Captive User Expenditures, in Current Period Dollars.

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Fundamental Driving Forces

Key Business Trends:

- Shorter product life cycles
- More customization/specialization
- Narrower market segments
- Higher impact of technology
- More competition from overseas vendors

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Blocking Factors

- Infrastructure gridlock
- Lack of qualified in-house personnel
- Existing applications portfolio
- Organizational response time

Create opportunities for the information services industry

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Technology Trends

- Not a driving force
- Evolutionary vs. revolutionary
- Three phases of technology application
  - Comparative advantage
  - Comparative parity
  - Comparative necessity

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Key Future Trends—Impact on IS

Trend	Impact on IS
Business integration—within companies	Centralization of infrastructure planning
Business integration—between companies	
Decentralization of technology	

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Key Future Trends—Impact on IS

Trend	Impact on IS
Increasing use of communications	Network view of the corporation
Emphasis on business planning	Decreased involvement in operations

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Information Services Industry Trends

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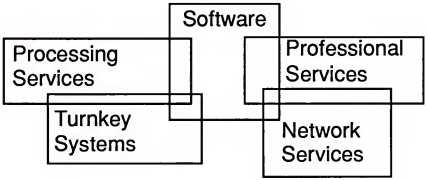
IS Market Structure—1980s

INPUT's View



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Market Forecasts
1989-1994

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Impact of Equipment Slowdown on Information Services

- Information services will lag Equipment
- Selective downturn
  - Mainframe-related
  - Minicomputer-related

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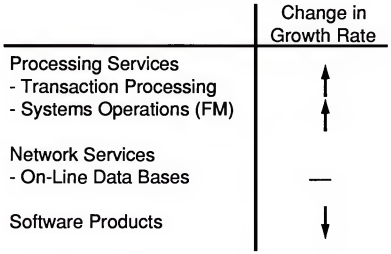
Impact of Equipment Slowdown
(Short-Term)



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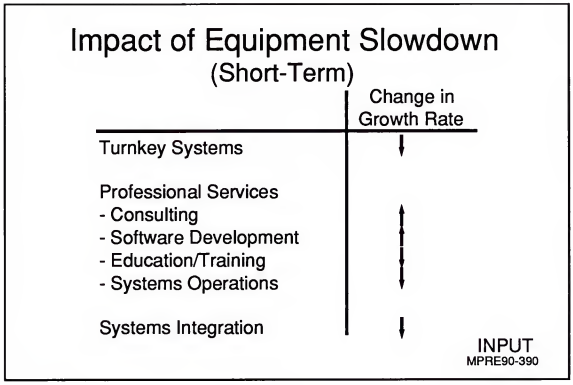

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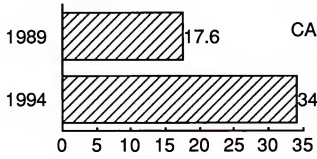
Professional Services Market Forecast



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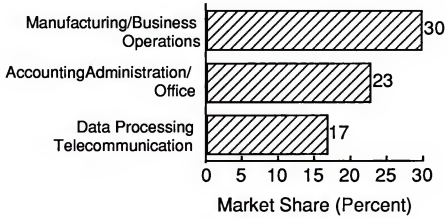
Professional Services Expenditures by Application Area



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Notes

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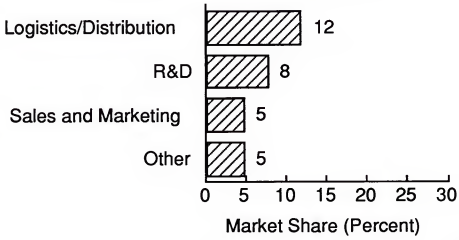
Professional Services Expenditures by Application Area



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Professional Services Major Trends

- New technology creates demand
  - Conversions
  - Knowledge-based systems
  - Cooperative processing
  - Networking
  - C++
  - Image processing
  - Multimedia systems

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Notes

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Major Vendors' Shares of Total U.S. Professional Services Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (Percent)
IBM	1,180	8
GM/EDS	740	5
Andersen Consulting	500	3
Unisys Corporation	440	3
CSC Corporation	415	3

* INPUT Estimates

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Notes

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Major Vendors' Shares of Total U.S. Professional Services Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (Percent)
Emhart/Planning Research	320	2
Ford Aerospace/BDM Int'l	300	2
TRW, Inc.	290	2

* INPUT Estimates

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Major Vendors' Shares of Total U.S. Professional Services Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (Percent)
Boeing Computer Services	240	1
Peat Marwick	190	1

* INPUT Estimates

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Opportunities and Recommendations

- Specialize
- Develop alliances within other delivery modes
- Enhance education and training offerings
- Follow standards and regulatory processes
- Monitor new technologies

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Processing Services Opportunities

- Voice/data processing services
- Link to network services
- Catastrophic health care bill
- Time-sensitive solutions
- Bank and financial services processing
- Non-IBM disaster recovery
- Time-shared super-computing

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Transaction Processing

- Major Trends
  - Continuing trend for users "outsourcing"
  - Customer inertia
  - Vendor ability to deliver proven results quickly
  - Strong vendor positions in specific niches
  - Continual improvement in workstation/PC price performance

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Recommendations

- Evaluate role of new technologies/ applications
- Determine how transmitted data can be processed
- Understand technical requirements for connection between user's operations and your services

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Network/Electronic Information Services Market—Driving Forces

- Business need for rapidly available electronic information
- RBOC entry
- Network management services
- Voice information services
- Transaction "electronification"

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Network/Electronic Information Services Market—Driving Forces

- PC population
- Consumer information services
- ISDN
- EDI popularity
- Wide-area networking

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Network/Electronic Information Services Market—Inhibiting Forces

- Data overload
- CD/ROM as alternative
- Profitability questions

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Software Products

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Software Products Market Issues

- Hardware and software development moving toward synchronization
- Software vendors promoting a number of "de facto" standards
- Technical, not market, differentiation

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Software Products Market Issues

- Software complexity increasing
- Development resources decreasing
- Product life cycles
- Capital supply constraints
- Redundant software products

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Vendor-Related Driving Forces

- Computer equipment
  - Link disparate product lines
  - Leverage system software
  - Leverage 3rd party software relationships
- Computer software
  - Leverage software development efforts
  - Maximize equipment vendor relationships

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Major Vendors' Shares of Systems Software Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (Percent)
IBM Corporation	2,800	23
Digital Equipment Corp.	900	7
Computer Associates	570	5
Unisys Corporation	500	4
Hewlett-Packard	230	2

* INPUT Estimates

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Major Vendors' Shares of Systems Software Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (Percent)
Ashton-Tate	200	2
Microsoft	180	1
Wang Laboratories	170	1
NCR Corporation	160	1
Novell, Inc.	150	1
Cincom Systems	140	1

* INPUT Estimates

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Vertical Markets

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Conclusions

- Double-digit annual growth for all vendors no longer "automatic"
- Worldwide markets offer real opportunities
- All vendors need alliances
- Consolidation will continue
- Standards play key role
- Users want total solutions

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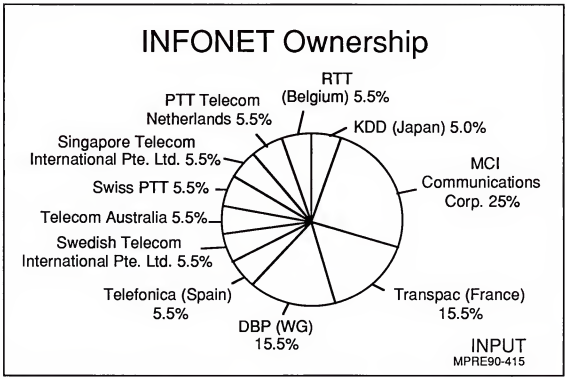

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Application Development Key Issues

Issue	Resp.
Productivity & quality	38
Use of technology	16
Responsiveness	14
Development process	11

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Applications Development Summary

- Backlog will never go away
- External resources becoming more common

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Applications Development Summary

- End user becoming a force and alternative
- Relational DBMS use in full bloom
- Data Management Will Have to Change

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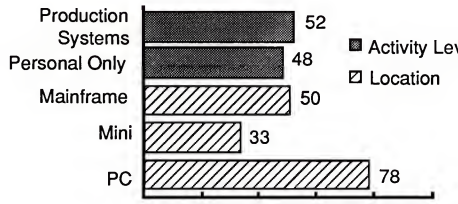
Development by the End User



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CASE Tools

New Development

Lifecycle Management	
Design	Code Generation
Documentation	

Maintenance

- Translators
- Analyzers
- Comparators
- Restructurers

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Application Development/CASE

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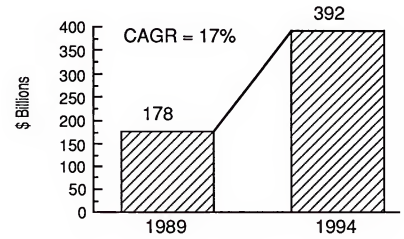
Worldwide Market Summary
Five-Year Forecast 1989-1994



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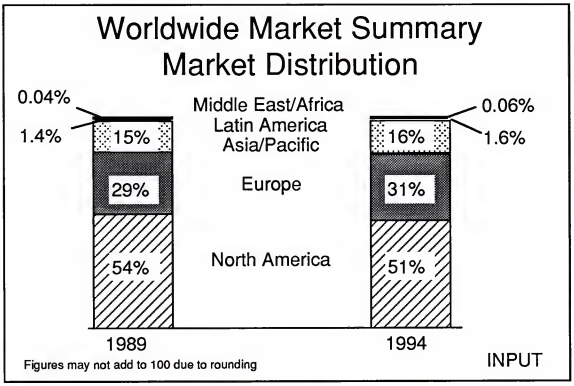

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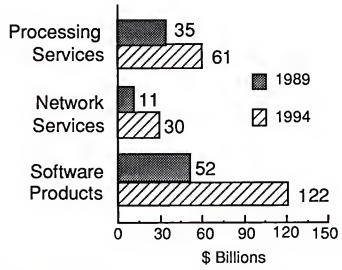
Worldwide Market Summary by Delivery Mode



	CAGR (Percent) World	U.S.
Processing Services	12	12
Network Services	22	20
Software Products	19	17

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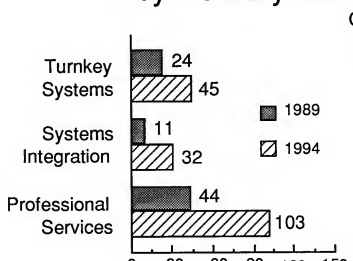
Worldwide Market Summary by Delivery Mode



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